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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/295,269	04/20/99	KHANDROS	I 3401P2D7D1US

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MM12/1229

EXAMINER

CUNEO, K

ART UNIT

PAPER NUMBER

2831

DATE MAILED:

12/29/99

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

9/295267

Applicant(s)

Khandros et al.

Examiner

Ceneo

Group Art Unit

2831

—The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address—

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

- ☒ Responsive to communication(s) filed on 4/20/99 & 7/20/99
- ☐ This action is **FINAL**.
- ☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 1 1; 453 O.G. 213.

Disposition of Claims

- ☒ Claim(s) 87-114 is/are pending in the application.
- Of the above claim(s) _____ is/are withdrawn from consideration.
- ☐ Claim(s) _____ is/are allowed.
- ☒ Claim(s) 87-114 is/are rejected.
- ☐ Claim(s) _____ is/are objected to.
- ☐ Claim(s) _____ are subject to restriction or election requirement.

Application Papers

- ☒ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.
- ☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.
- ☒ The drawing(s) filed on 4/20/99 is/are objected to by the Examiner.
- ☒ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

- ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- ☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been received.
- ☐ received in Application No. (Series Code/Serial Number) _____
- ☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

Attachment(s)

- ☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____
- ☒ Notice of Reference(s) Cited, PTO-892
- ☒ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Interview Summary, PTO-413
- ☐ Notice of Informal Patent Application, PTO-152
- ☐ Other _____

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DETAILED ACTION

Drawings

1. This application has been filed with informal drawings which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed. See attached form PTO-948.
2. The drawings are objected to by the examiner for improper cross hatching. All the parts shown in section should be cross hatched according to MPEP 608.02, page 600-84.

Specification

3. In the specification, first paragraph, please update the continuation information.
4. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Treatment of Claims Based on Language and Format

35 U.S.C. § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 88-114 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant

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regards as the invention.

The recitation of a "sharp point," for example in claim 88, is indefinite. Sharp is a relative term, and it is unclear what constitutes a sharp. Also, a point is not a physical object: it is a mathematical entity. In nontechnical terms, a point is generally used to denote an end with a small surface area. However, in the environment of electronic packages where everything is small, is it unclear what a small surface or a point is.

The tip structure "being formed as a part of" a cantilevered structure, for example as in claim 90, is indefinite. It is unclear whether the tip is a cantilevered free end, or whether this limitation is a method of making recitation.

The description "relatively flexible" is indefinite, because its metes and bounds are unclear. See for example claim 91.

Use of Markush language to describe an open set, such as that in claim 92, is improper. A suggested correction is to state "the group of . . ."

In claim 94, section a is confusing, because it is unclear which are the elements of the core material and which are the additives to the copper.

The recitation of having a "small amount," such as in section a of claim 94 is indefinite, because the quantity is unclear.

Claim 101, line 2, "the shell" lacks proper antecedent basis. See also claim 102.

Claim 103, line 2, "the core" and "the shell" lack proper antecedent basis. This pertains to all of the claims depending from claim 87 which recite the shell and the core.

Please correct these and similar errors in all of the claims whether or not specific mention of the claim is made above.

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Treatment of Claims Based on Prior Art

35 U.S.C. § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 87-92, 94-95, 98-102, 106-110 and 112-114 are rejected under 35 U.S.C. 102(b) as being anticipated by Kanji et al. (US 5067007, hereafter Kanji).

Claim 87: Kanji discloses resilient elongated element (11), figures 1A, 1C and 1D, which has a contact tip structure (the end adjacent the surface (4)).

Claim 88: The tip structure is formed with an end which is considered as a sharp point, given the size of the surface area of the end relative to other dimensions of the structure.

Claim 89: See layers (11B) and (12) at the end.

Claim 90: The structure is formed as a part of a cantilevered structure, because, prior to connection to the chip, only one end of the structure was attached.

Claim 91: The flexible core is (11A) and the shell is (11B).

Claims 92, 101-102: See Column 7 at line 65 for the material of the layer on the core or the shell.

Claim 94: Column 7 at line 63 discloses Cu, and the Cu will have small amounts of Be as impurity.

Claim 95: The diameter of the core can be .25-.3 mm, column 2 at line 22, less the

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thickness of the shell layer, top of column 8, (too small to affect the above number to more than 1/1000).

Claim 98: The structural limitations of this claim are identical to that of claim 87 and the shell is layer (11B).

Claims 99-100: As the material of the shell is the same as the claimed invention, the physical properties of yield and tensile strength are inherently met.

Claim 106: The substrate is (1).

Claim 107: See figure 1A.

Claim 108: The product resulting from this product-by-process claim is the same as the structure of Kanji. Therefore, Kanji properly anticipates this claim.

Claim 109: The core is (11A) and the shell is (11B).

Claim 110: For the material see column 7 at line 65.

Claim 112: The Cu of the core is taught at column 7, line 63. The Cu has small amounts of Be in the form impurity.

Claim 113: The structural limitations of this claim are identical to that of claim 109, and therefore taught by Kanji.

Claim 114: Consider the substrate (4) and the component package (2). The first intimate bond is that of the core with conductive contact terminal (8) and the second intimate bond is where the layer (11B) contacts (8) adjacent the first bond.

35 U.S.C. § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

10. Claim 93, 96-97, 103-105 and 111 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kanji .

Claims 93, 103 and 111: Kanji discloses the claimed invention as explained with respect to claims 92, 87 and 110 except for the core being made of Au. Nevertheless, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to make the core from Au for superior electrical conductivity, because gold is a routinely used as a contact structure in the electronic industry.

Claim 96: Kanji discloses the claimed invention as explained with respect to claim 87 except for the diameter of the core.

Kanji discloses that the core can be reduced from the usual size to 0.3 mils, column 2 at lines 20-22. Nevertheless it would have been obvious to make the diameter of the core any size necessary including 0.5-3 mils, because selection of any known diameter based on design

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requirements is well known. The diameter may be chosen larger to adapt the structure for higher current carrying capacity, for better mechanical support or for reduced manufacturing cost in low lead density packages where smaller contact structure sizes are not needed.

Claim 97: Kanji discloses the claimed invention as explained with respect to claim 87 except for the length of the core. Nevertheless it would have been obvious to make the length of the core any size necessary to yield the spacing of the package and board as mandated by design requirements, because selection of the size of contact structures to meet dimensional requirements is a matter of common sense.

Claims 104-105: Kanji discloses the claimed invention as explained with respect to claim 91 except for the thickness of the shell being 0.25 to 10 mils. Kanji discloses that the shell can be made of gold, but only discloses that a thickness of $1\mu\text{m}$ is required. Nevertheless, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to make the thickness of the gold shell 0.25 to 10 mils for better conductivity and better protection of the core, because selection of the thickness of a coating layer depends on design requirements and is within the level of ordinary skill. As gold is a soft metal, increase of the thickness of the shell will not adversely affect the mechanical properties of the structures.

Closing

11. Any inquiries concerning this communication or earlier communications from the examiner should be directed to Examiner Kamand Cuneo at (703) 308-1233. Examiner Cuneo's supervisor is Mrs. Kristine Kincaid whose telephone number is (703) 308-0640.

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December 19, 1999

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